

Technology of Measurement...

**defined**

# emfis

- Digital Multi-Function Meter
- Load Manager
- Demand Controller

Energy Metering, Monitoring & Management System for Industrial and Commercial Application



HPL provides wide range of multifunction meters which displays more than 45 parameters with AC/DC and HT applications.



# emfis

## Digital Multifunction Meters



emfis vif

Voltage • Current • Frequency

emfis vifp

Voltage • Current • Frequency • Power



### Salient Features

- Three Line Backlit LCD Display
- Suitable for 3 Phase 4 Wire LT Network
- Three Push Buttons on Front Panel for Programming and scrolling
- Optically Isolated Energy Pulse Output available in emfis vifpe
- RS485 MODBUS Communication available in emfis vifpe
- Provision for Special Pre-defined pages for display parameters available in emfis vifp & emfis vifpe
- CT Secondary -/1A or -/5A (site selectable)
- Power On Hours / Run Hours Parameters

### Typical Applications

- Electrical Panels - Industrial LT Panels.
- Motor Control Centres, Distribution Control and Relay Panels.
- Air Conditioning and Refrigeration Panels etc.
- Genset Panels
- Generation, Transmission and Distribution Panels
- Test Benches and Laboratory Equipment
- Uninterrupted Power Supplies
- Special OEM Application

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**emfis vie**

Voltage • Current • Energy

**emfis vifpe**

Voltage • Current • Frequency • Power • Energy



**Technical Specifications**

**ENCLOSURE**

Dimensions	96mm x 96mm x 86mm
Weight	<400gms

**FRONT PANEL**

Display	Three Line backlit LCD Display
Digit Height	8mm x 5mm
Protection Index	IP54

**INPUT CURRENT**

Via Current Transformer with Primary	From 5A to 6000A Configurable in multiples of 5 for -/5A & from 1A to 1200 A configurable in multiples of 1 for -/1A
Insulated Secondary	5A / 1A (Selectable)
Current circuit burden	<0.25VA
Starting current	5mA (Secondary)
Overload without CT	7A
Overload with CT	6500A

**INPUT VOLTAGE**

Measurement range	120V AC to 300V AC P - N
Voltage circuit burden	≤ 2VA

**AUXILIARY SUPPLY**

Supply Value	230V AC, ±30%, 50Hz
Burden	≤ 2.5VA

**Accuracy**

Class	1.0
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**PULSE OUTPUT**

Duration	100ms
Width	1pulse=1kWh

**Special Features**

- For ease in monitoring, Special Pre-defined pages have been provided with following display.

Screen 1	Screen 2	Screen 3
R Phase	Y Phase	B Phase
Active Power	Active Power	Active Power
PF, Current	PF, Current	PF, Current
Voltage	Voltage	Voltage

Note: Available in emfis vifp & emfis vifpe

# LOAD MANAGER



**emfis HT**

For HT Application

**emfis Basic**

Voltage • Current • Frequency • Power • Energy



## Salient Features

- Last 6 months history parameters for kWh, kVAh, kVArh (lag, lead), kW MD & kVA MD with Date & Time on RS 485 Communication which gets updated at 00.00 hours on the last day of the month.
- Maximum Demand with Real Date & Time
- Scroll Lock Facility provided to monitor the desired Parameters
- CT & PT Primary both Field Programmable
- Available in 3P,4W & 3P,3W\* Network
- RS485 MODBUS Communication (Optional)
- Provision for Special Pre-defined pages for display parameters\*

Note: PT Primary is applicable only for Emfis HT Meter.

\* Applicable only for Emfis HT Meter

## FRONT PANEL

Display	Three Line Backlit LCD Display
Digit Height	8mm x 5mm
Protection Index	IP 54

## INPUT VOLTAGE

Measurement Range	120V AC to 300V AC P - N (Basic) 60V AC to 110V AC P - N (HT)
Via Voltage Transformer: Primary (for emfis HT Only)	110V/1.1kV/2.2kV/3.3kV/6.6 kV/11kV/22kV/ 33kV/66kV/121kV/132kV (Selectable)
Via Voltage Transformer: Secondary (for emfis HT Only)	110V (Fixed)
Voltage Circuit Burden	≤ 2VA

## AUXILIARY SUPPLY

Supply Value	230V AC, ±30%, 50Hz (Basic) 60V AC to 300V AC, ±5%, 50Hz (HT)
Burden	≤ 2.5 VA

## ACCURACY

Class 1.0	Available in Emfis Basic & Emfis HT
Class 0.5	Available in Emfis Basic Only

## PULSE OUTPUT (Only for emfis Basic)

Duration	100ms
Width	1 Pulse = 1 kWh

\* Value applicable only for emfis basic

## Technical Details of emfis HT & emfis Basic Meter

### ENCLOSURE

Dimensions	96mm x 96mm x 86mm
Weight	< 400 gms

### INPUT CURRENT

Via Current Transformer	From 5A to 6000A in Multiples of 5 for -/5A & From 1A to 1200A in Multiples of 1 for -/1A
Insulated Sec.	5A / 1A (Selectable)
Current Circuit Burden	<0.25 VA
Starting Current	5mA*/10mA (Secondary)
Overload without CT	7A
Overload with CT	6500A

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Demand Controller

## emfis Plus (Demand Controller)

Voltage • Current • Frequency • Power • Energy • THD

### Salient Features

- Last 6 Months history Parameters for kWh, kVAh, kVArh (lag, lead) & MD through Communication
- Provision for Special Pre-defined pages for display parameters
- Scroll Lock Facility provided to monitor the desired Parameters
- Maximum Demand with Date and Time
- Measures Total Harmonic Distortion
- Relay Output for V, I, Total kW, Total kVA, F, kW MD, kVA MD
- Last 30 days load Survey through Communication
- Last 10 occurrence/restoration event for each Relay 1 & Relay 2 through Communication

### Technical Details of emfis Plus

#### ENCLOSURE

Dimensions	96mm x 96mm x 86mm
Weight	< 400 gms

#### INPUT CURRENT

Via Current Transformer	From 5A to 6000A in Multiples of 5 for -/5A & From 1A to 1200A in Multiples of 1 for -/1A
Insulated Sec.	5A / 1A (Selectable)
Current Circuit Burden	<0.25 VA
Starting Current	5mA (Secondary)
Overload without CT	7A
Overload with CT	6500A

#### FRONT PANEL

Display	Three Line Backlit LCD Display
Digit Height	8mm x 5mm
Protection Index	IP 54

#### INPUT VOLTAGE

Measurement Range	120V AC to 300V AC P - N
Voltage Circuit Burden	≤2VA

#### AUXILIARY SUPPLY

Supply Value	230V AC, ±30%, 50Hz
Burden	≤2.5 VA

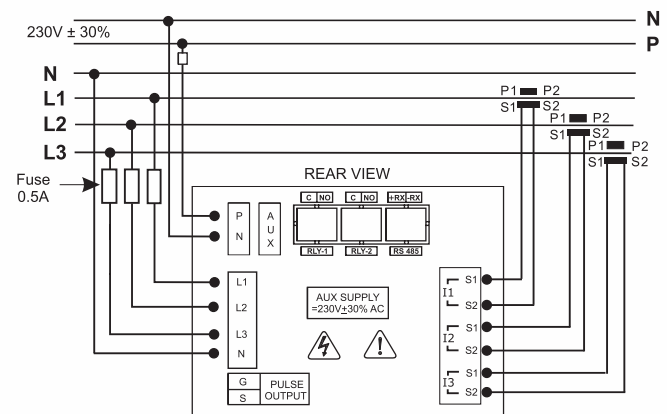
#### ACCURACY

Class	1.0
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#### Pulse Output

Duration	100ms
Width	1 Pulse = 1 kWh

### Wiring Diagram of Emfis Plus Meter



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## emfis DC

For DC Applications

### Salient Features

- Displays : Voltage, Current, Power , Energy
- RS485 MODBUS RTU Communication (Optional)
- Password Protected Programming
- 6 Months History for kWh, MD kW, Channel Peak Load available on communication
- Reverse Shunt Connection Indication
- Reverse Voltage Connection Indication
- Shunt disconnection Indication

### Resolution of Emfis DC Meter

System Voltage	XX.XV
Current Channel Wise	XX.XX A (< 100A) XXX.X A (≥100A)
Power Channel Wise	XX.XX kW (≥1kW) 0.XXX kW (< 1kW)
Energy Channel Wise	XXXXXX.X kWh

### Display Parameters of Emfis DC meter

Measures & Displays the following parameters :

- Real Date / Time
- System Voltage
- Current Channel wise
- Power Channel wise
- Energy Channel wise
- Total Energy

### Communication Parameters of emfis DC meter

- Real Date / Time
- System Voltage
- Current Channel wise
- Power Channel wise
- Total & Channel wise Cumulative Energy
- Last 6 Months kWh Channel wise
- Last 6 Months MD (integration period 30 minutes) Channel wise
- Last 6 Months Peak Load (integration period 30 seconds) Channel wise

## Technical Details of emfis DC

### ENCLOSURE

Dimensions	96mm x 96mm x 86mm
Cutout Size	92mm x 92mm
Weight	< 350 gms
Termination	Rear Side
Operating Temp.	-10 to 70°C

### FRONT PANEL

Display	16x2 Line Dot Matrix Backlit LCD Display
Character Size	5.0mm x 3.65mm
Protection Index	IP 54 (Front Panel)

### INPUT CURRENT

Current Channels	4 Channels / 6 Channels
Current Sensor	External Shunt (configurable shunt rating from 10 to 120 mV in multiples of 1 mV)
Current Range	Configurable (1 to 1000 Amps in multiples of 1A)

### INPUT VOLTAGE

Input Voltage	20V DC to 60V DC
Over Voltage	80V (Continues)

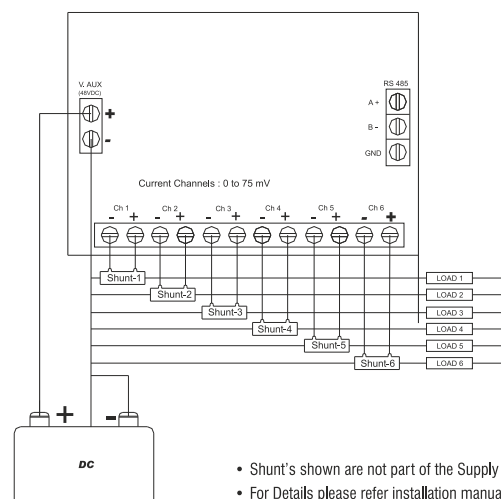
### AUXILIARY SUPPLY

Power Consumption	< 1 Watt (20V to 60V)
Accuracy	± 1% (for 5% to 120% of range)

### COMMUNICATION

Protocol	MODBUS in RTU mode
Slave ID	1 to 247 (Programmable)
Baud rate	4800/9600/19200/28800/38400 Configurable
Stop Bit	1
Parity	None
Data Bit	8 bits

### Wiring Diagram of Emfis DC Meter



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# Parameters Measured

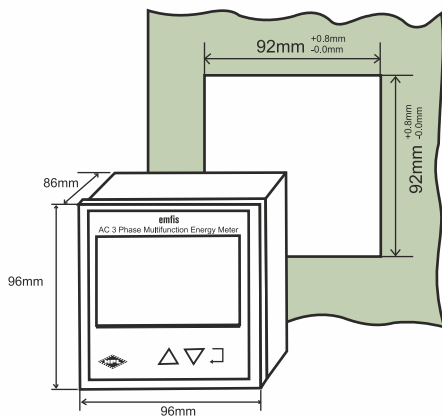
S.No.	Parameters	vif	vie	vifp	vifpe	Basic	Plus	HT Basic
1	Inst. Phase -- Neutral Voltage	✓	✓	✓	✓	✓	✓	✓
2	Inst. Phase wise Current (Amp)'	✓	✓	✓	✓	✓	✓	✓
3	Inst. Phase wise Active Power (kW)			✓	✓	✓	✓	✓
4	Inst. Phase wise Apparent Power (kVA)			✓	✓	✓	✓	✓
5	Inst. Phase wise Reactive Powder (kVAr)			✓	✓	✓	✓	✓
6	Inst. Phase wise Power Factor (PF)			✓	✓	✓	✓	✓
7	Inst. Frequency (Hz)	✓		✓	✓	✓	✓	✓
8	System Power Factor (PF)			✓	✓	✓	✓	✓
9	Real Date & Time					✓	✓	✓
10	Active Energy		✓		✓	✓	✓	✓
11	Apparent, Reactive Lag Energy					✓	✓	✓
12	Reactive Lead Energy					✓	✓	✓
13	Inst. Line Voltage (Volts)	✓	✓	✓	✓	✓	✓	✓
14	Total Active, Apparent & Reactive Power			✓	✓	✓	✓	✓
15	Avg. Active, Apparent & Reactive Power			✓	✓	✓	✓	✓
16	Max. Active, Apparent & Reactive Power			✓	✓	✓	✓	✓
17	Phase Wise Average Voltage (Volts)						✓	
18	Phase Wise Maximum Voltage (Volts)						✓	
19	Phase Wise Average Current (Amps)	✓	✓	✓	✓	✓	✓	✓
20	Phase Wise Maximum Current (Amps)	✓	✓	✓	✓	✓	✓	✓
21	Total Current (Amps)	✓	✓	✓	✓	✓	✓	✓
22	Meter Run Hour (Hr)	✓	✓	✓	✓	✓	✓	✓
23	Meter Power on Hour (Hr)	✓	✓	✓	✓	✓	✓	✓
24	kW MD with Date & Time					✓	✓	✓
25	kVA MD with Date & Time					✓	✓	✓
26	R Phase -- kW, Current, Voltage & PF			✓	✓	✓	✓	✓
27	Y Phase -- kW, Current, Voltage & PF			✓	✓	✓	✓	✓
28	B Phase -- kW, Current, Voltage & PF			✓	✓	✓	✓	✓
29	Total Harmonic Distortion in Phase Voltage (%)						✓	
30	Total Harmonic Distortion in Phase Current (%)						✓	
31	Total Harmonic Distortion in Line Voltage (%)						✓	
32	CT Ratio	✓	✓	✓	✓	✓	✓	✓
33	PT Ratio							✓
	Communication Parameters							
1	Pulse Output		✓		✓	✓	✓	
2	Special Screens shots feature			✓	✓	✓	✓	✓
3	RS485 MODBUS Communication				✓	✓	✓	✓
4	Slave ID Programmable				✓	✓	✓	✓

**Ordering Information**

TYPE	Model Number
<b>EMFIS PLUS</b>	
Emfis Plus Basic	NEMFPCT2EMFA1
Emfis Plus Basic with RS485	NEMFPCT2EMFA2
Emfis Plus Basic with 2Nos. Relay Output	NEMFPCT2EMFA3
Emfis Plus Basic with 2Nos. Relay Output with RS485	NEMFPCT2EMFA4
<b>EMFIS Basic</b>	
Emfis Basic Class 1.0	NEMFCT2EMFA1
Emfis Basic Class 1.0 with RS485	NEMFCT2EMFA2
Emfis Basic Class 0.5	NEMFCT2EMFA15
Emfis Basic Class 0.5 with RS485	NEMFCT2EMFA25
<b>EMFIS HT</b>	
Emfis HT Basic 3P, 4W	NEMFCT2EMFB1
Emfis HT Basic 3P, 4W with RS485	NEMFCT2EMFB2
Emfis HT 3P, 3W Model	NEMFCT2EMFB13W
Emfis HT 3P, 3W Model with RS485	NEMFCT2EMFB23W
<b>EMFIS LT 3 PHASE 4 WIRE</b>	
emfis vif	NEMFVIF00000
emfis vie	NEMFVIE00000
emfis vifp	NEMFVIFP0000
emfis vifpe	NEMFVIFPE000
emfis vifpe with RS 485	NEMFVIFPEA20
<b>EMFIS DC</b>	
Emfis DC Basic 4 Channels	EMFDC4CHA0SHXXX
Emfis DC Basic 6 Channels	EMFDC6CHA0SHXXX
Emfis DC Basic 4 Channels with RS485	EMFDC4CHA1SHXXX
Emfis DC Basic 6 Channels with RS485	EMFDC6CHA1SHXXX

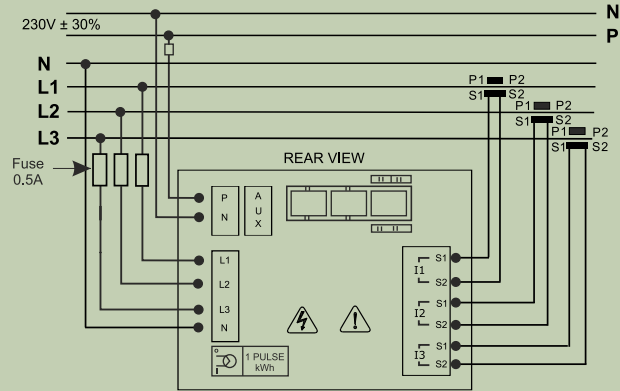
**Cutout Details**

The Panel Meter is to be firmly secured using the 4 transparent fixing clips.  
 Use 0.5mm<sup>2</sup> to 2.5mm<sup>2</sup> Cable for Voltage terminals Use 3 mm<sup>2</sup> to 6mm<sup>2</sup> cable for Current terminals.

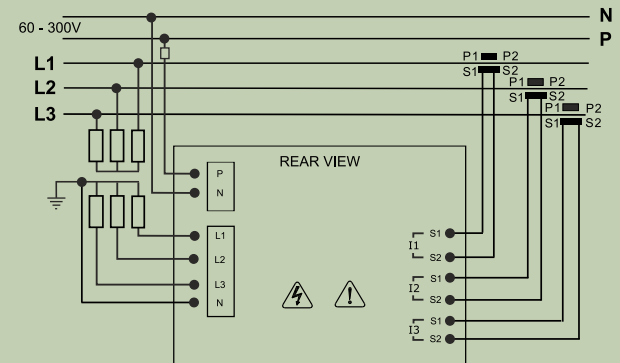


**Wiring Diagram of Emfis meters**

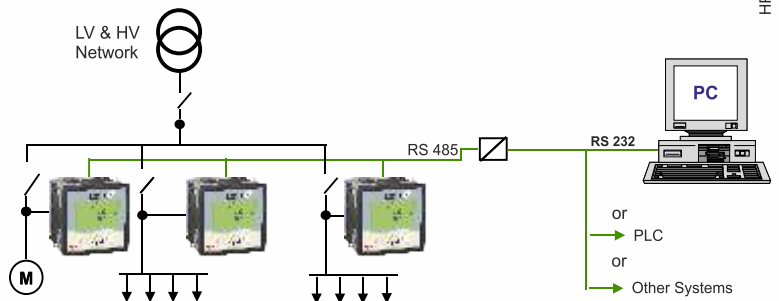
1. For 3 phase 4 wire emfis for LT application (for vif, vie, vifp, vifpe, & Basic)



2. 3 phase 4 wire emfis HT Meter for HT application.



**Communication**



HPL/EMFIS/0817



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